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User Manual

Moisture Analyser

PCE- MB series 50-100-200

Measuring method description

File: ba-moisture-analyser-pce-mb-50-100-200-en

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1. General description

MB series moisture analyser is destined for fast and precise moisture determination. The moisture analyser is based on two cooperating devices: the balance, used to measure current sample weight, and the dryer, which dries the sample using halogen heaters. Drying parameters may be set according to user preferences.

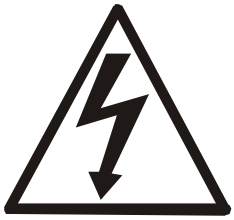
Moisture analysers are mainly destined for use in quality control in food industry, building materials industry, biotechnology, pharmacy, environment protection and others.

Moisture analysers may be also used as laboratory balances for routine weighing (without drying).

2. Completeness

Standard package consists of:
1. Moisture analyser,
2. Pan shield, pan support, pan handle,
3. Single-use pans – 10 pcs,
4. Power supply cord,
5. User manual,
6. Guarantee card.

3. Security rules



To avoid electrical shock or damage of the balance or connected peripheral devices, it is necessary to follow the security rules below.

- Dryer chamber cover heats up to 40°C, but perforated cover at the top may heat up over 60°C. Do not touch the cover top during drying as it may cause severe burns!
- During heating, the halogen heaters warm up to very high temperature. Avoid touching the heaters as it may cause severe burns!
- All repairs and necessary regulations can be made by authorised personnel only.
- Do not use the analyser when its cover is opened.
- Do not use the analyser in explosive conditions.
- Do not use the analyser in high humidity.
- If the device seems not to operate properly, plug it out of the mains and do not use it until checked by authorised service.

4. Environment protection

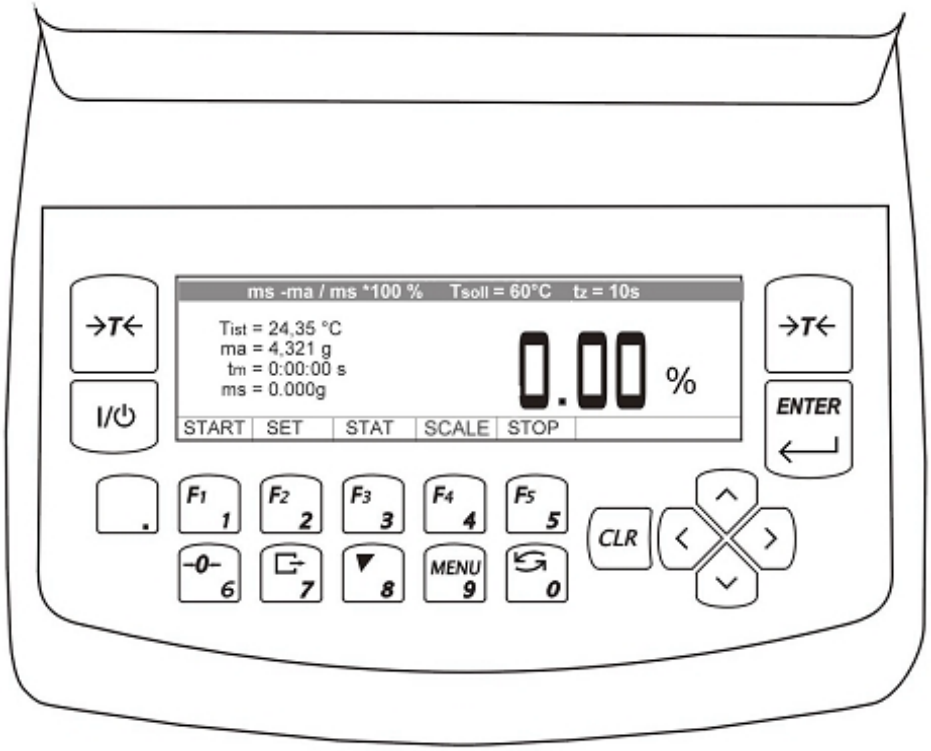
	According to legal regulations it if forbidden to dispose wasted electronic equipment in waste containers. **WEEE-Reg.-Nr. DE64249495**

- Please return wasted device to the point of purchase or other company specialised in recycling of wasted electronic components.

5. Technical data

Type	PCE-MB 50	PCE-MB 100	PCE-MB 200
Maximum sample weight	50g	100g	200g
Minimum sample weight	0,02g	0,02g	0,02g
Reading unit (d)	1mg	1mg	1mg
Verification unit (e)	0,01g	0,01g	0,01g
Tare range	- 50g	- 100g	- 200g
Accuracy class	II		
Working temperature	+18 ÷ 33°C		
Analyser resolution	0,01%		
Moisture measurement accuracy	for sample weight 0,1g÷5g ..... ±0,3% for sample weight 5g÷15g ..... ±0,06% for sample weight >15g ..... <±0,04%		
Max drying temperature	160°C		
Sampling time	1 ÷ 180s		
Maximum drying time	< 10h		
Oven dryer power (halogen l=118mm)	100W		
Warm-up time (100°C)	~1min.		
Pan size	ϕ90mm		
Drying chamber dimensions	ϕ108x20mm		
Weight	7kg		
Device dimensions (with legs)	215(235)x345x200mm		
Power	~230V 50Hz 110VA		
Calibration weight (OIML)	F2 50g	F2 100g	F2 200g

6. Keys and indicators

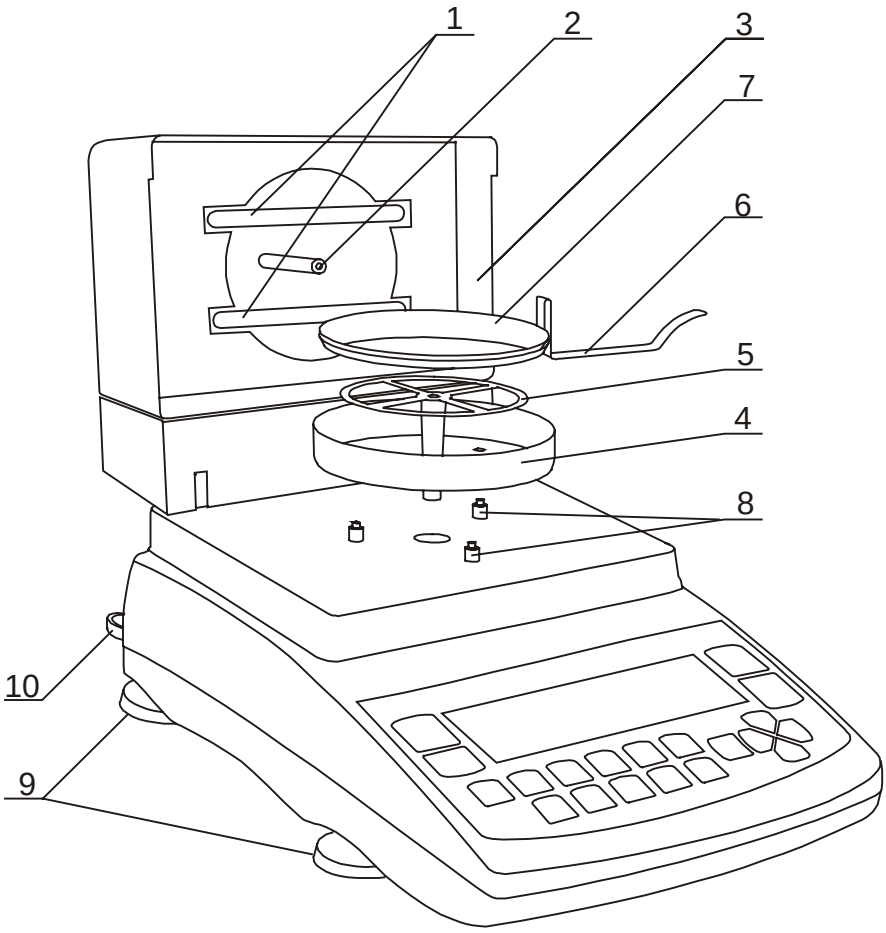


→T←	-	tare (subtract package weight from weighed mass)
I/ ⏻	-	switch- on / switch-off (standby),
ENTER	-	confirmation / select the option
.	-	decimal point,
1/F1	-	digit key 1 / START – start measurement (drying),
2/F2	-	digit key 2 / SETTINGS – moisture measurement parameters setting,
3/F3	-	digit key 3 / STAT – drying chart, measurement report,
4/F4	-	digit key 4 / BALANCE – weighing mode,
5/F5	-	digit key 5 / STOP – instant drying termination,
6/→0←	-	digit key 6 / zeroing (optional)
7/	-	digit key 7 / printout (data transmission),
8/	-	digit key 8 / autocalibration (unused function),
9/Menu	-	digit key 9 / enter the Menu
0/	-	digit key 0 / mode switching (analyser – balance)
>	-	enter the option,
<	-	leave the option,
∧	-	navigation / move the cursor up,
∨	-	navigation / move the cursor down,
indicator	-	result stabilisation,
bar indicator	-	total load indicator (0-100%),
indicator OFF	-	stand-by mode (when switched-off with I/ ⏻, key),
Max, Min, d, e	-	metrologic parameters.

7. Preparing moisture analyser to work

During heating, the halogen heaters *1* warm up to very high temperature. When drying chamber is opened avoid touching the heaters as it may cause severe burns or damage the heaters!

Dryer chamber cover *3* heats up to 40°C, but perforated cover may heat up over 60°C. Do not touch the top cover during drying as it may cause severe burns!



1. Take all contents out of a package: the moisture analyser and packed separately: the tin pan shield, single use pans, the pan handle and the pan support.
2. Place the balance on a stable ground not affected by mechanical vibrations and airflows.
3. Level the balance with rotating legs *9* so that the air bubble in water-level *10* at the back of the balance is in the middle and the moisture analyser rests on all four legs.
4. Open the dryer chamber with the handle at the front. Put the pan shield *4* on three distance sleeves *8*. Gently insert the pan support *5* into the mechanism hole.

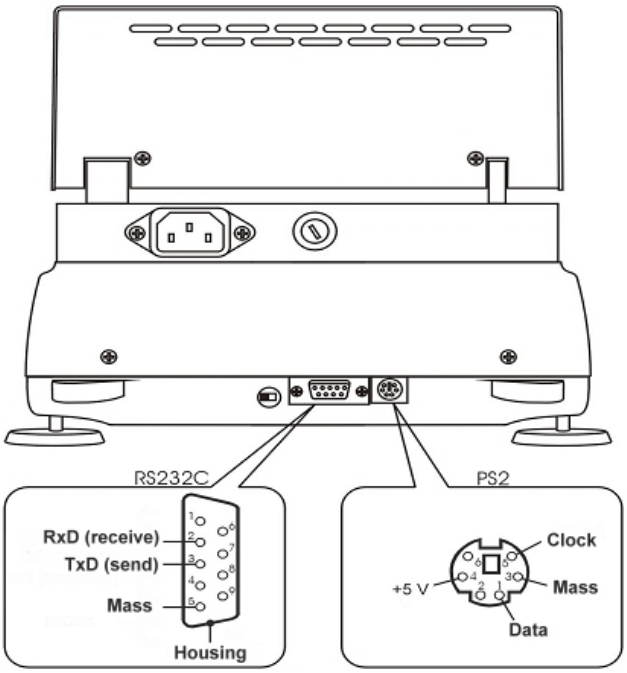
5. Place a single use pan *7* on the pan handle *6* and put the pan on the pan support (the handle should rest on the pan shield so that it does not touch the pan or the pan support).
6. Close the drying chamber cover *3* and plug the device to the mains (230V).
7. After self-tests and result stabilisation zero indication is displayed. The dryer starts initial heating (signalised with an appropriate communicate). After initial heating the moisture analyser is ready to work.

When temperature during initial heating exceeds 105°C or heating time is longer than 1 minute, terminate initial heating with CLR key and check if the temperature sensor *2* works properly and if both halogen heaters light *1* (see chapter 15).
In case any defect occurs contact an authorised service point.

8. The balance should not be used to weigh ferromagnetic materials due to accuracy decrease.

8. Interfaces

The moisture analyser is equipped with RS23C interface to connect a printer or a computer and with PS2 port to connect an external computer keyboard.



9. General working rules

During transportation remove the pan, the pan support and the pan shield and place it in a separate package.

1. Distribute a sample all over the pan. A sample surface should not touch temperature sensor placed above the pan.
2. The balance is equipped with the tare equal to its range. To tare the balance press “T” key. Writing the tare does not extend measuring range, but only subtracts the tare value from a load placed on the pan. To make weight control easier and to avoid range overdrawing, the balance is equipped with weight indicator (graduated in percentages).
3. Do not overload the balance more then 20% of maximum load (Max).
4. The mechanism of the balance is a precise device sensitive to mechanical strokes and shocks. Do not press the pan with a hand.

10. Description of thermogravimetric analysis

This section gives some practical details about moisture analysis using infrared radiation for reliable results and easier use of moisture analyser. The description is based on a pre-production experience and customers’ suggestions.

Moisture in substances is an essential quality factor of technical and economical importance.

Methods of determining moisture may be grouped in two main categories: absolute and deductive.

Absolute methods are based on simple relations, e.g. weight decline during drying. Thermogravimetric analysis used in PCE moisture analyser is an example of this method.

Deductive (indirect) methods measure physical quantity related with moisture, e.g. electromagnetic waves absorption, electrical conductance, acoustic wave speed. Some of these methods, unlike thermogravimetric analysis, enable to determine water content.

Thermogravimetry - *lat.* thermo – heat, gravi – weight, metry – method

Thermogravimetric analysis – a process of determination of a substance mass decline as a result of heat-up. The sample is weighed before and after heating-up, the difference is calculated in relation to initial weight or final weight (dry mass).

Moisture in substances

Thermogravimetric analysis includes all ingredients evaporating from substances during heating-up, which results in weight decrease.

In result of the above, determining of moisture content in substances is not equal water content. Beside water, moisture consists of all other volatile matter: fats, alcohol, aromas, organic dissolvent and other substances resultant as en effect of thermal decomposition.

Thermogravimetric analysis does not distinguish water from other volatile matters.

Infrared radiation drying is more effective than traditional methods (e.g. in an oven) as the radiation deeply penetrates the substance, which shortens drying time.

10.1 Infrared radiation source

MB series moisture analyser uses 2 halogen heaters (rated power 200W, l=118mm) in serial connection as a radiation source. The heaters emit also visible radiation, which does not affect drying process.

10.2 Infrared radiation drying description

Sample drying is a result of absorption of infrared radiation, which results in sample temperature increase and evaporation of volatile matters.

Infrared radiation penetrates surface layers, the depth depends on penetrability of a sample (different in various substances). Part of radiation is reflected by the sample surface. Penetrated layers absorb the radiation and convert its energy into heat. Emitted heat propagates inside the sample. Effectiveness of the propagation depends on thermal conductivity of the sample. The better the conductivity, the faster drying process and volatile matter evaporation. During drying process sample parameters change, its thermal conductivity decreases so there is a risk of burning the sample. Some parameters may be estimated “by sight”, e.g. smooth

and light surfaces reflect radiation better. This must be taken into account when setting drying parameters.

10.3 Drawing and preparation of a sample

As sample of given substance must be representative, drawing and preparing a sample is very important process as it affects repeatability of measurements. The most common method of homogenizing a sample is mixing. The other method is to draw few samples from different but specific points in a substance and calculate an average value. Another – to draw few samples from different points in a substance, mix them and draw a sample from the mixed samples.

Sampling method depends on the object of a research. For quality purpose many representative samples are analysed. In production control it is enough to assure sampling repeatability, which enables to study a tendency.

While preparing and drawing, it is important that the sample does not absorb moisture from the environment – it is advised that operation time is as short as possible.

If it is necessary to analyse more than one sample at the same time, the samples should be closed in plastic bags or other isolated containers. Give attention that samples must not lose moisture inside the container (the container should not consist of to much air, the moisture condensed on the sides of the container should be mixed with the sample again).

10.4 Tools requirements

Tools and instruments used in preparation process may affect measurement accuracy, so it is advised not to use tools that transmit heat, as it makes the sample lose moisture before analysis.

Use only special mills and pestles.

In case of liquids with consisting of solid materials use a glass mixer, a spoon or a magnetic mixer.

10.5 Single-use pans

To analyse the moisture, put a sample on a single-use pan and place it in the dryer chamber.

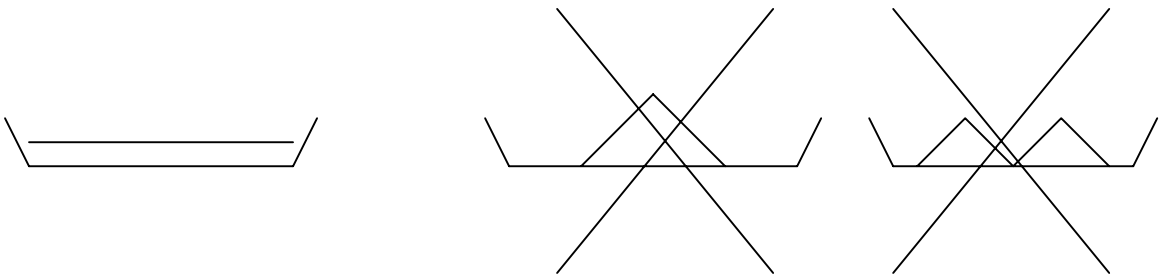
Using non-reusable pan helps to avoid false results by remains of previous samples.

10 single use pans are provided with the moisture analyser. Any quantity may be delivered on demand.

10.6 Placing a sample

A sample should be placed uniformly all over the pan, so that heat propagates equally all over the sample and dries whole sample effectively and quickly without leaving “wet” places.

Correct **Incorrect**



Attention:

Due to temperature sensor localisation, max sample height is 10mm.

When substance ply is too thick, surface layers will be heated too much and internal – not enough. This may result in burning the sample or surface incrustation, which will make drying process difficult and measuring result false.

A sample should be placed in uniformed layers 2÷5mm thick, weighing 5÷15g, depending on a substance.

10.7 Glass fibre filter

When drying liquids, pastes or substances that may melt or loose liquid during drying, it is advised to use glass fibre filters.

Filters ensure equal liquid distribution or, in case solid materials, avoiding burning a sample.

10.8 Practical notes

Put a sample on the pan as quickly as possible to avoid losing moisture.

Temperature inside the chamber is much higher than outside, so the sample may evaporate partly before measurement begins, which will result in a false result.

When analysing the same substance quantity in successive measurements, use the same tools to put a sample to be sure that samples are each time of the same size.

Before putting a sample, tare a single-use pan and take it out of the chamber. Right after putting a sample on the pan, place it inside the analyser chamber, close the chamber and press START.

Be sure that no dirt sticks under the pan, as it may increase sample weight and result in false values.

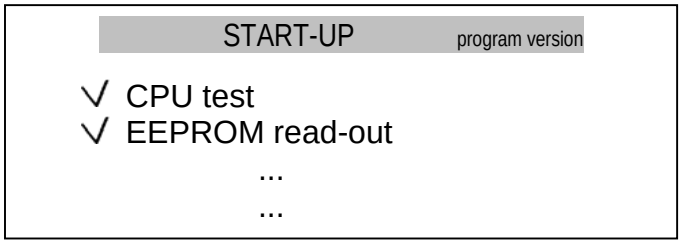
10.9 Troubleshooting

Problem	Solution
A sample burns down	Reduce temperature Use glass fibre filter on the top of the sample Reduce sample quantity and distribute it uniformly
Drying lasts too long	Increase temperature Reduce sample mass
A sample loses weight before measurement	Take out the pan and put a sample outside the chamber
A sample is liquid or paste	Use glass fibre filter
A sample does not consist of enough volatile matters	Enlarge a sample

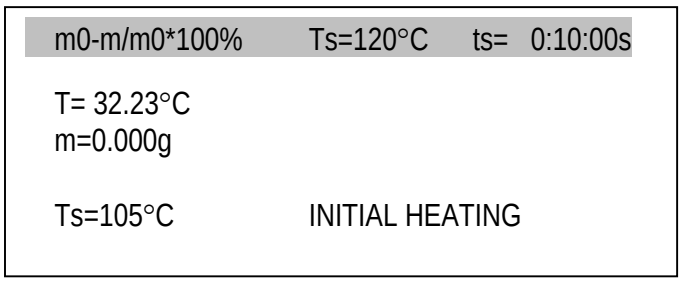
11. Moisture analyser functioning description

11.1 Switching on

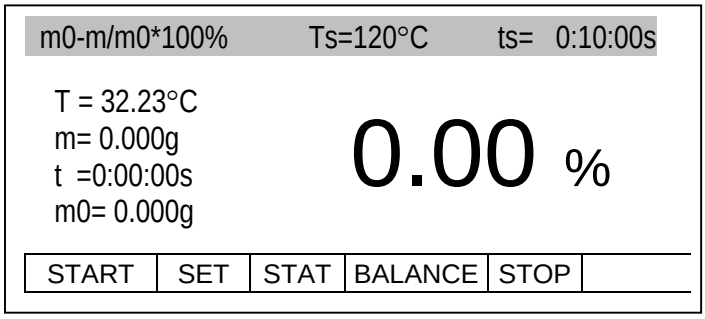
After switching-on the moisture analyser proceeds with self-tests.



After completing self-tests, the analyser is tared and the dryer begins initial heating necessary to create thermal conditions suitable for measurements.



Initial heating should warm the drying chamber up to 105°C within 1 minute.
When temperature during initial heating exceeds 105°C or heating time is longer than 1 minute, terminate initial heating with CLR key and check if the analyser is not damaged (see chapter 15).
After initial heating is completed (or terminated), the device displays the following information:



Legend:
m0-m/m0*100% - formula used to calculate the moisture
Ts – defined drying temperature
ts – defined drying time
T – current temperature in the drying chamber
m – current weight,
t – current drying time
m0 – initial weight

11.2 Description of parameters and working modes

Current value of moisture measurement is calculated and displayed during drying. The process is finished under one of the conditions below:

1. Evaporating is finished and successive weight measurements results (samples) do not differ.
2. User defined *Drying time* is finished.

Ad.1 The number of successive samples that terminates drying process is called *Qualifying quantity*. It is advised to use 5 samples, but it is possible to use smaller qualifying quantity. Time interval between each weight sample (*Sampling interval)* may be adjusted according to drying rate.

Ad.2 To terminate a measurement after defined *Drying time*, set *Qualifying quantity*: *none*.

The moisture can be calculated basing on different mathematical formulas, used in the moisture analyser as *Working modes*:

1. Moisture is determined in relation to initial weight

$$w\ [\%] = m_0\text{-}m/m_0*100\%\ ,$$

where m_0 – initial weight, m- current weight

2. Moisture is determined in relation to current weight

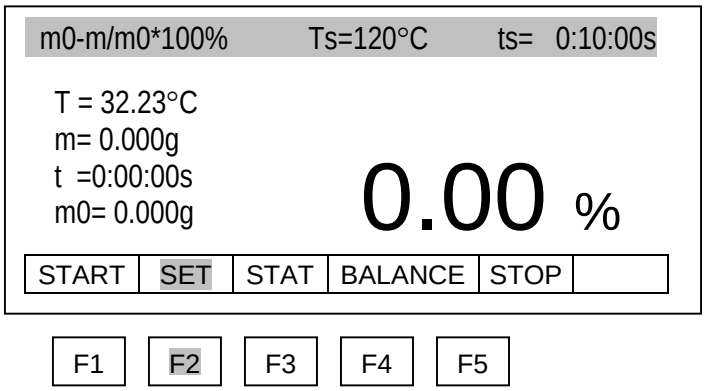
$$w\ [\%] = m0\text{-}m/m*100\%\ ,$$

3. Current weight determined as a percentage of sample weight

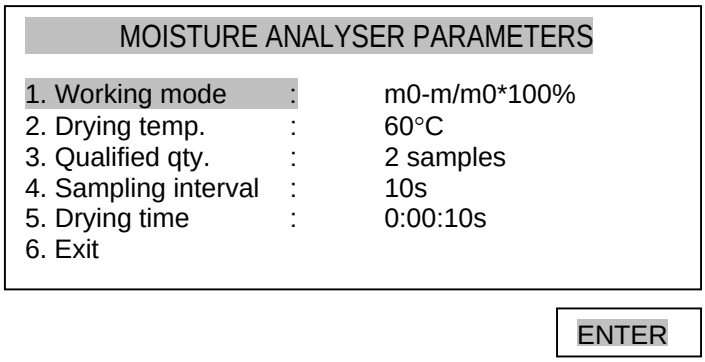
$$w\ [\%] = m/m_0*100\%\ .$$

Drying temperature is maximum temperature measured by the temperature sensor near dried sample. Pay attention that temperature of dried material may be higher than temperature of its surrounding.

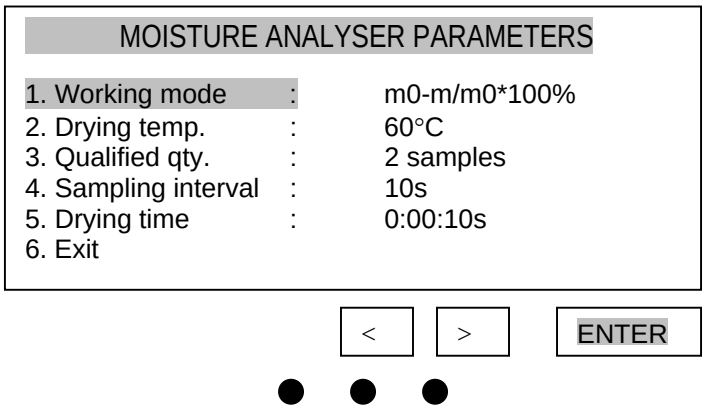
11.3 Working mode parameters setting



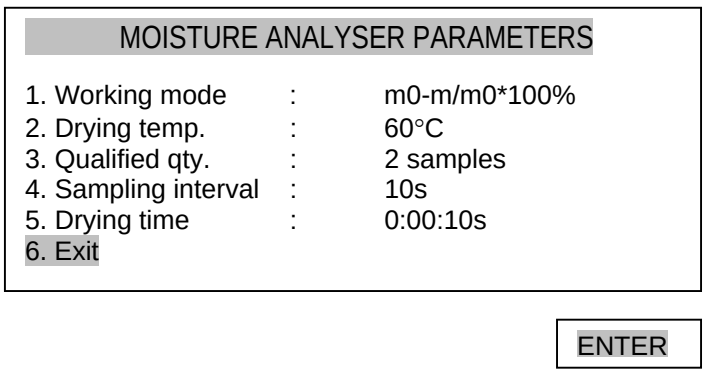
Choose *Settings* option (SET) pressing *F2* key.


MOISTURE ANALYSER PARAMETERS
1. Working mode : m0-m/m0*100%
2. Drying temp. : 60°C
3. Qualified qty. : 2 samples
4. Sampling interval : 10s
5. Drying time : 0:00:10s
6. Exit
ENTER

Choose *Working mode* using ∧ and ∨ keys and press *ENTER*.


MOISTURE ANALYSER PARAMETERS
1. Working mode : m0-m/m0*100%
2. Drying temp. : 60°C
3. Qualified qty. : 2 samples
4. Sampling interval : 10s
5. Drying time : 0:00:10s
6. Exit
< > ENTER

Using <, > and digit keys (if necessary) choose desired drying parameters and press *ENTER* to accept.
- Moisture calculation formula,
- Qualified quantity (options: none, 2, 3, 4, 5),
- Sampling interval (<180s.),
- Drying time (< 10h)


MOISTURE ANALYSER PARAMETERS
1. Working mode : m0-m/m0*100%
2. Drying temp. : 60°C
3. Qualified qty. : 2 samples
4. Sampling interval : 10s
5. Drying time : 0:00:10s
6. Exit
ENTER

To leave settings menu choose Exit and press *ENTER*.

Note: All defined parameters are stored in the memory until the next changed (also after unplugging the device from the mains).

11.4 Initial moisture analysis

To estimate optimal drying parameters for unknown sample, it is advised to proceed with initial measurement necessary to make initial measurement with activated drying chart. For initial drying set the following parameter values (see Drying parameters setting):

Temperature:

- organic matters: 80 – 100°C

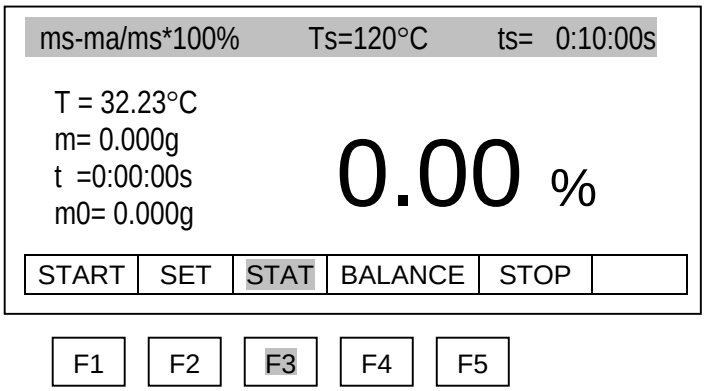
- mineral matters: 140 – 160°C

Qualifying quantity: none (drying process is stopped after defined drying time)

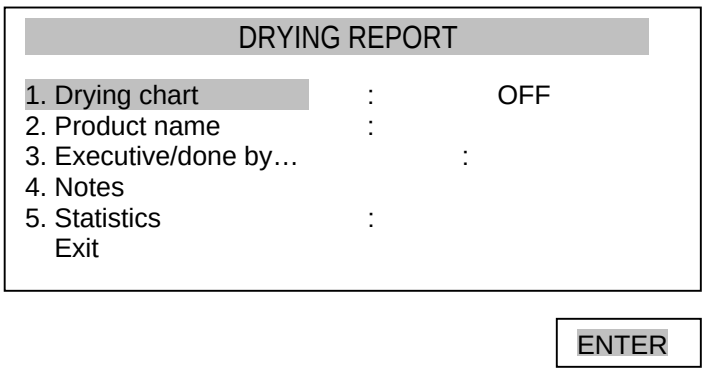
Sampling interval: 1s

Drying time: set the time value enough to dry the whole sample

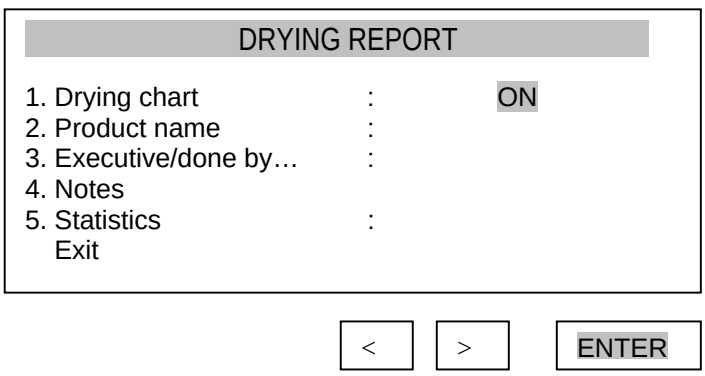
To display drying chart follow the instruction below:



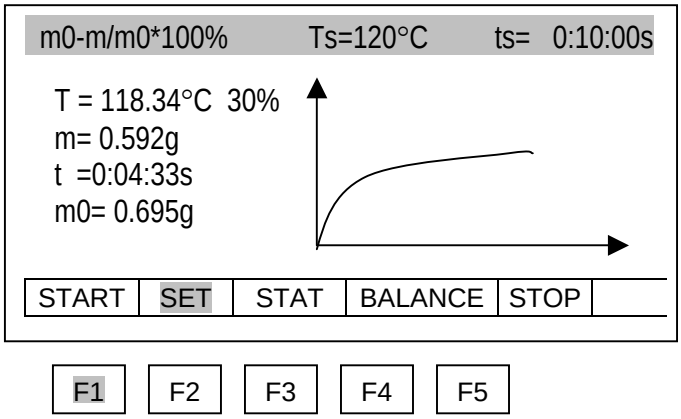
Choose *STAT* option with *F3* key, select *Drying chart* and press *ENTER*.



Choose *Drying chart* using ∧ and ∨ keys and press *ENTER*.



Using < and > keys choose ON and press *ENTER*.



When drying chart is visible, place a sample on the pan and choose *START* option (*F1* key). Drying parameters and drying process chart are presented on the display.

Observing the drying process chart, it is possible to estimate its course and determine the time value needed for complete drying of the sample. The X-axis presents 160 time intervals (for longer time periods the scale is changed to 360, 720, etc.), the Y-axis presents moisture values according to chosen formula (the scale is changed automatically to 10%, 30%, 50%, etc.).

The moment of complete drying is visible as a bend of the drying chart. Drying time should be defined with a reserve, considering differences of weight of successive samples. If drying time is too short the results of moisture analysis will not be correct.

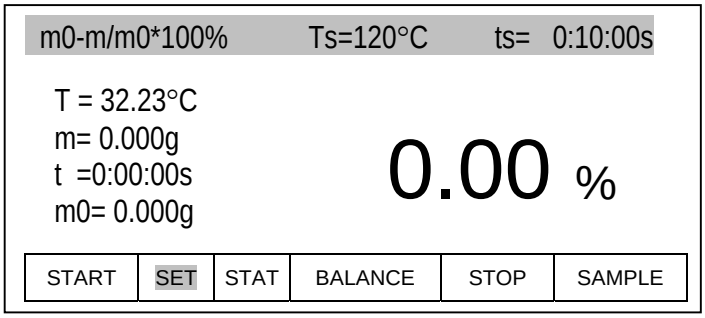
For initial drying, to condense the chart, advised sampling time is 1s. For proper analysis sampling time should be as long so that the difference between first and last sample is greater than 20mg. At the beginning advised qualifying quantity value is 5.

Notes:

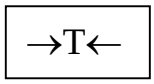
1. Remember to disable the drying chart before proper measurement.
2. For more efficient work it is possible to use a computer program for drying charts (purchased separately on demand).

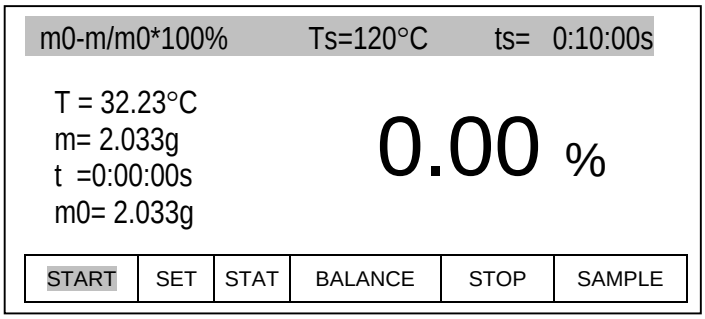
11.5 Proper moisture analysis

Before measurement carefully prepare the sample (as described in chapter Description of Thermogravimetric Analysis) and set correct drying parameters (see chapter Working Parameters Setting).

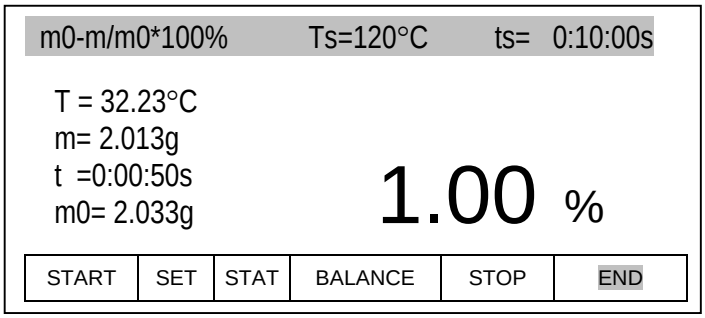


Place an empty single-use pan and tare the balance with →*T*← key. Open the drying chamber and using the pan handle place the single-use pan with the sample on the pan support. Close the chamber.





Start the measurement choosing *START* option (*F1* key). Drying in progress is signalised with alternating SAMPLE / DRYING communicate.



Wait until STOP communicate appears. Now read the result.

During the measurement the following information is displayed:

m0-m/m0*100% - mathematic formula used for calculations

T s – defined drying temperature

ts - defined drying time

T – current drying temperature

m – current weight

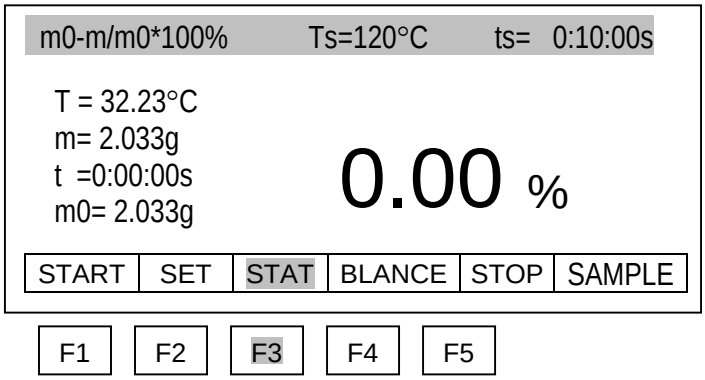
t – current drying time

m0 – initial weight

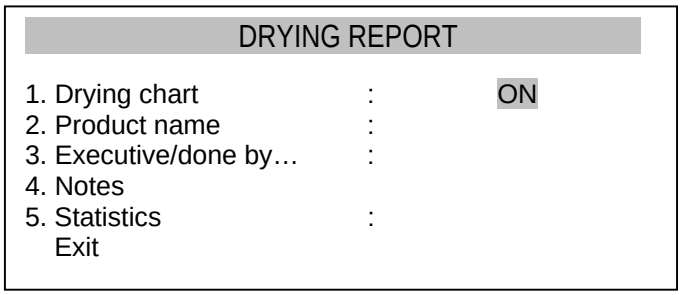
12. Connecting to a computer or a printer

When drying process is finished measurement result can be printer or a computer via RS232C interface.

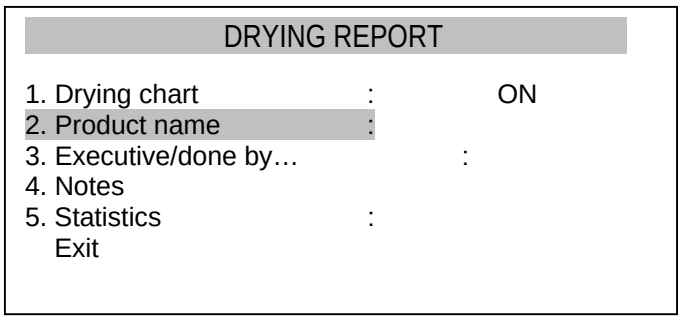
Measuring data can be also completed with text information. To enter text descriptions it is necessary to connect a computer keyboard to PS2 port at the back of the moisture analyser.



Choose *STAT* option (*F3* key).



Using navigation keys and ENTER key choose *Drying chart* and disable or enable printing and displaying the chart.



Select necessary options and with the connected computer keyboard enter text information for printed report.

To print the drying report press ⎘ key.

Drying started:
- -

Date: ...
Time.: ...

Drying parameters
- -
Drying temp.: ...
Mode: ...
Finished: ...

Initial weight: ...
Final weight: ...
Drying time: ...
Sampling interval: ...
Moisture: ...

NOTE:
The analysis proceeded by:

Signature .....

It is possible to set necessary serial port parameter values (8bit, 1stop, no parity, 4800bps). To use *RS232C Settings* option press ↻ key (weighing mode) and pres *MENU* key.

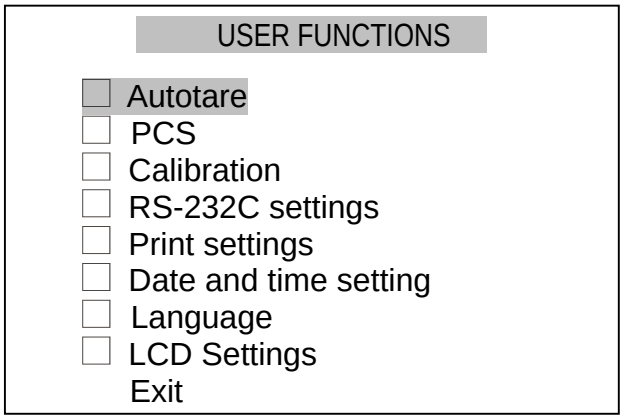
13. Testing and calibration of the balance

To ensure reliable results it is advised to check balance accuracy with an object of precisely known weight (e.g. calibration weight F2 (OIML) as stated in Technical Data for specific type) before and after each measuring session. In case incorrect values it is necessary to calibrate the balance: press ↻ key to switch to weighing mode, activate Calibration option using MENU key and follow the instructions on the display (see chapter Sensitivity Calibration).

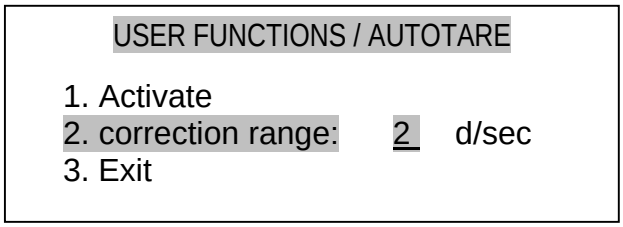
14. Moisture analyser as a balance

The moisture analyser may be also used as a normal balance. To switch between analyser / weighing mode press ⟲ key or use option BALANCE (*F4* key).
In weighing mode *Menu* key opens a set of special functions. Standard functions are described below. Other special functions may be delivered on demand.

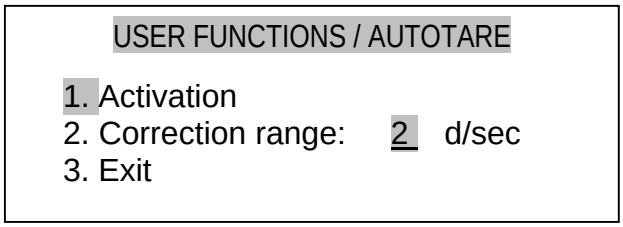
14.1 Autotare



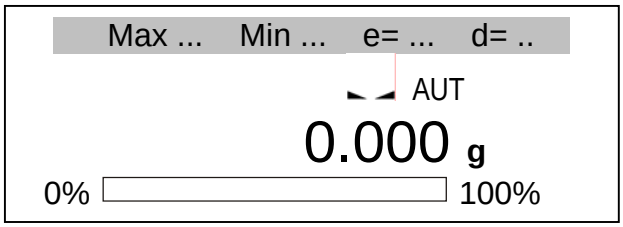
Press *Menu* key to enter the user function menu, chose *Auto-tare* and press *ENTER* key.



Chose *Correction range* and press *ENTER* key.
Enter maximum zero flow value to be automatically corrected (chose between 0.5 ÷ 5 verification unit(s) per second).



Chose *Activate* option and press *ENTER.*



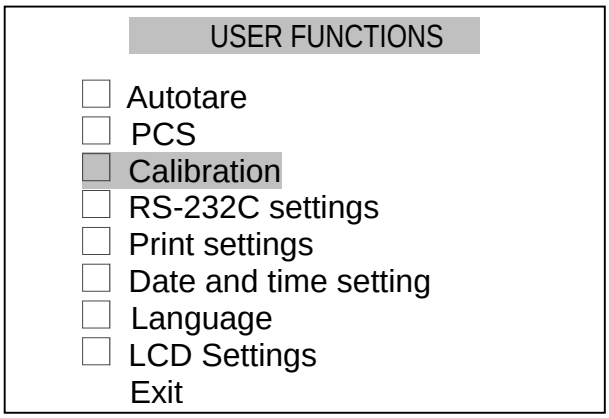
Any changes off the zero readout that are equal to a defined fraction of digits per second are automatically tared, independently of changing environment conditions (temperature, humidity, etc.).

To leave the function press *Menu* key, chose *Auto-tare* function and then chose *Deactivate* option.

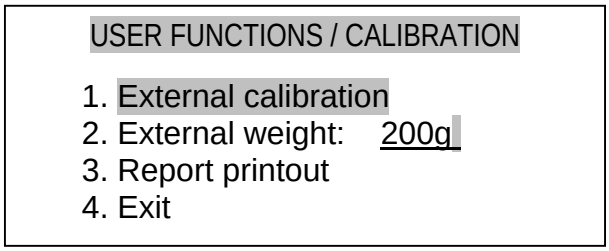
14.2 Balance calibration

Calibration with external weight standard should be performed in case indications exceed permissible error. To calibrate the balance use calibration weight as stated in Technical Data table (or of better accuracy).

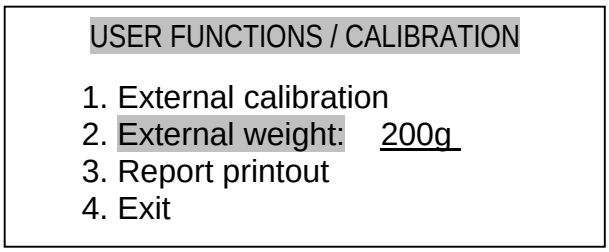
Calibration options:



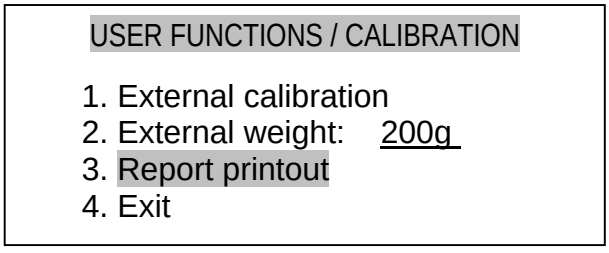
Press MENU key choose *Calibration* option and press ENTER.



To calibrate the balance use *External calibration* option (described in further part of the instruction).



Option *External weight* enables to enter the value of used calibration weight. Choose *External weight* option, press ENTER and use > and < keys to select desired value. It is advised to use as great weight value as possible.



To print a calibration report, connect a printer and use *Report printout* option. Calibration report is a proof of correct calibration process and may be useful for balance diagnostics.

Report example:

Date : ... Time.: ...

Calibration report

Production date: ...

Serial number: ...

Program version: ...

Adjustation No.: ...

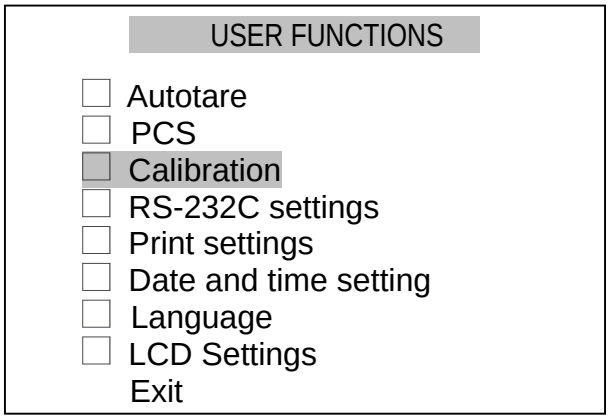
Ext. calibration weight: ... - external weight value used for last calibration

Factory calib. weight: ... - (unused parameter)

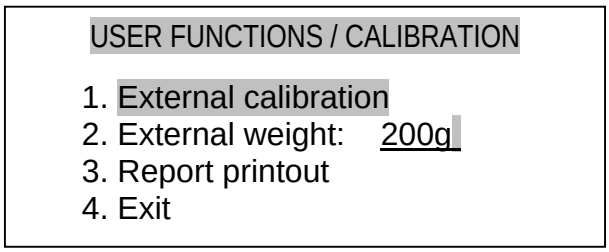
Int. calib. weight: ... - (unused parameter)

Weight difference : ... - (unused parameter)

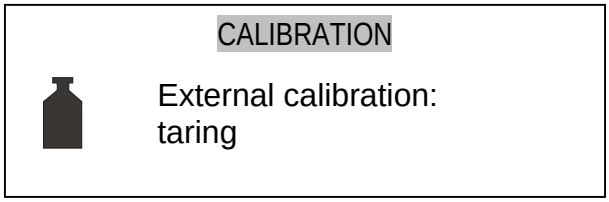
Calibration operation sequence:



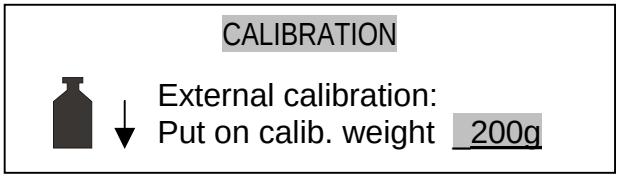
Press *Menu* key, choose *Calibration* and press *ENTER* key.



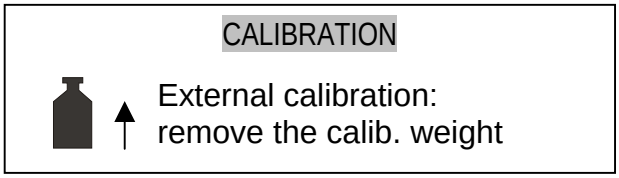
If necessary, enter the correct value of used calibration weight using *External weight* option.
Select *External calibration* option and press ENTER to start calibration.



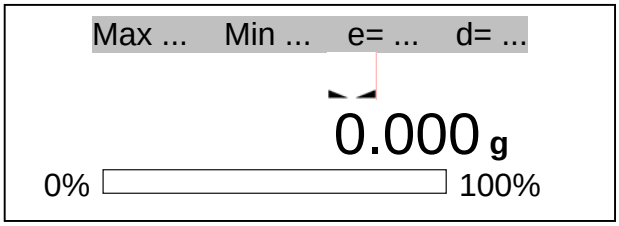
Wait until tare process is finished.



Place proper calibration weight on the pan.



Remove the calibration weight from the pan.

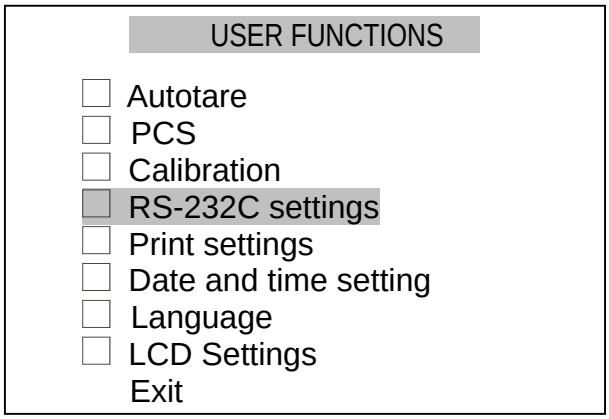


After completing calibration process the balance is the weighing mode.

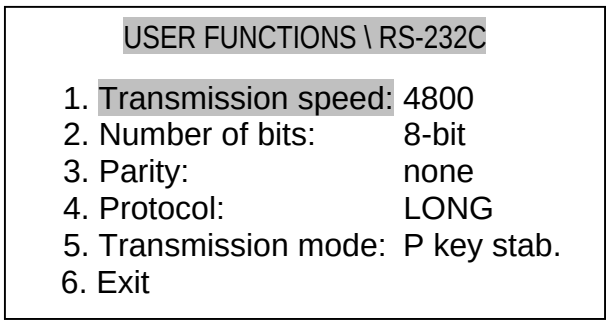
14.3 RS-232C settings

To establish a connection between the balance and a printer (or a computer), set identical transmission parameters for both devices. Default parameters for the moisture analyser are: 8bit, 1stop, no parity, 4800bps. To set different transmission parameters, switch the analyser to weighing mode using *BALANCE* option (*F4* key), press MENU key and choose *RS232C parameters* function.
Choose between the following parameters:

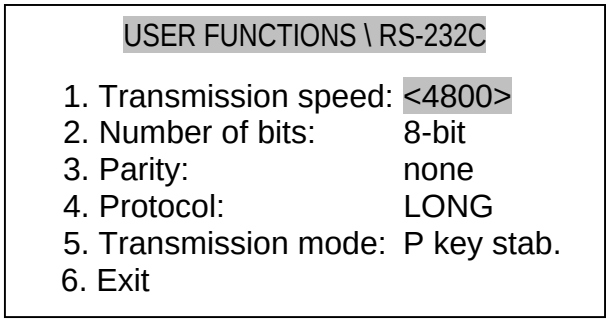
- transmission speed (1 200 ÷ 115 200bps),
- number of bits in a sign (7 or 8 bits),
- parity control (none, even, odd),
- protocole mode (default value LONG),
- transmision mode (after pressing ⮆ key with stable indication, after pressing ⮆ key independently of indication stabilisation, automatically after stabilisation of each measurement, continuous in 0,1s periods).



Press MENU key, choose *RS232C settings* and press ENTER key.



Select desired parameter with ∧ and ∨ keys and press ENTER key.



Using < and > keys choose desired value and press *ENTER* key.

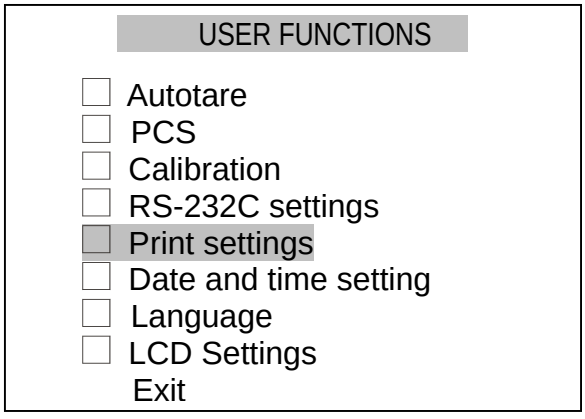
Data transmission protocol description (Long protocol)

Transmission parameters: 8bitów, 1stop, no parity, 4800bps
Computer→Balance: initialising signal S I CR LF (53h 49h 0Dh 0Ah)
Balance→Computer: balance indication in the following format (16Bytes)

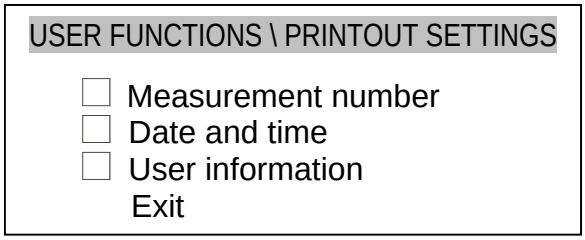
Byte	1	-	sign or space
Byte	2, 11 and 14	-	space
Byte	3÷4	-	digit or space
Byte	5÷9	-	digit, decimal point or space
Byte	10	-	digit
Byte	12	-	k, l, c, p or space
Byte	13	-	g, b, t, c or %
Byte	15	-	CR (0Dh)
Byte	16	-	LF (0Ah)

14.4 Printout parameters

This function enables to select following information for printouts:
- successive measurement number,
- curremnt date and time for each measurement,
- user information (available on demad) – additional information entered with external keyboard.



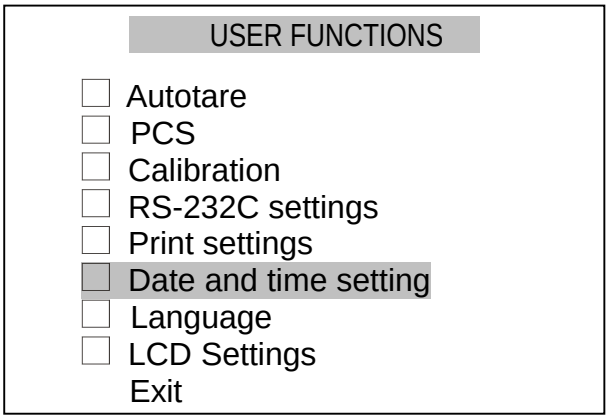
Press MENU key, choose *Printout settings* and press ENTER key.



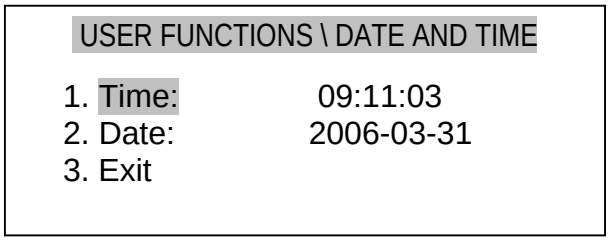
Using < and > keys choose desired option and press *ENTER* key.

14.5 Date and time setting

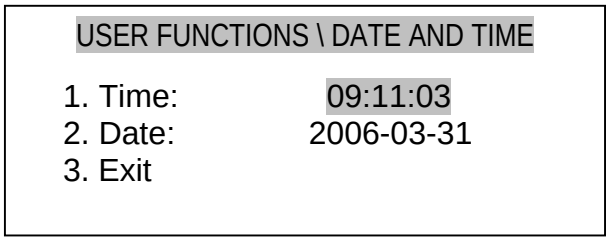
This function enables to set curent time and date (used in printouts):



Press MENU key, choose *Date and time setting* and press ENTER key.



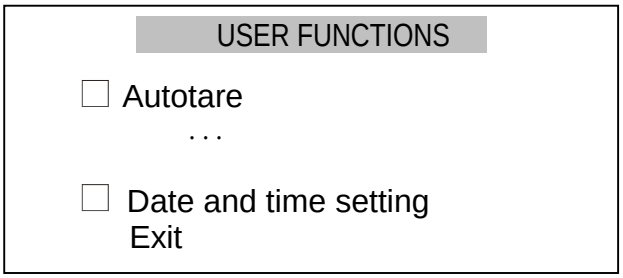
Using < and > keys choose desired value and press *ENTER* key.



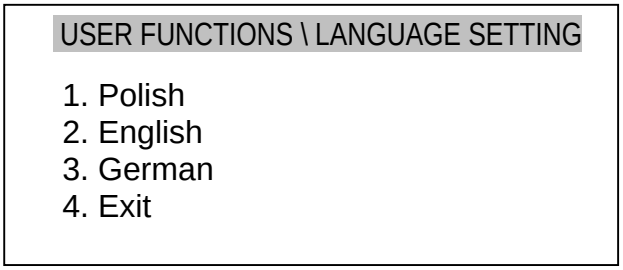
Use digit keys to enter correct values and press ENTER key to accept.

14.6 User language

This function enables to change user language (used for communicates and printouts):



Press MENU key, choose *Language settings* and press ENTER key.



Using < and > keys choose desired language and press *ENTER* key.

15. Troubleshooting

Display indication	Possible cause	Remedy
Initial heating Ts temperature exceeds 105°C, the sensor does not react when touched with a finger	The temperature sensor is damaged.	Contact an authorised service point.
Initial heating Ts temperature does not reach 105°C, the halogen heater(s) do not light.	The heater is damaged.	Replace the heater.
"Test ..."	Auto-tests in progress / electronic unit damage	wait for 1 minute
" - - - - "	The balance is during zeroing / mechanical damage	wait for 1 minute check if the balance is placed on stable ground, not affected by vibrations
„Tare range exceeded”	Tare key pressed during zero indication	Balance indications must be different than zero
„Zeroing range exceeded”	Permissible zeroing range was exceeded	Remove the load from the pan
„Weighing range exceeded”	Permissible weighing range (Max +9e) was exceeded	Reduce the load
„Measuring range exceeded (+)”	Upper limit of analog-digital transducer measuring range was exceeded	Remove the load from the pan
„Measuring range exceeded (+)”	Lower limit of analog-digital transducer measuring range was exceeded	Check if there are all necessary pan elements

16. Maintenance and repairs of small defects

1. A moisture analyser should be kept clean.
2. Take care that no dirt gets between the casing and the pan. If found any, remove the pan (lift it up), remove dirt and then replace the pan.
3. In case of improper operation caused by a short-lasting power supply decay, unplug the balance from the mains and then plug it again after few seconds.
4. It is forbidden to make any repairs by unauthorised persons.
5. To repair the scale, please contact an authorised service centre.

Declaration of Conformity CE

PCE-GROUP Europe

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E-Mail: info@warensortiment.de

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Internet: www.pce-group-europe.com

Konformitätserklärung

Declaration of conformity for apparatus with CE mark
Konformitätserklärung für Geräte mit CE-Zeichen
Déclaration de conformité pour appareils portant la marque CE
Declaración de conformidad para aparatos con disitintivo CE
Dichiarazione di coformitá per apparecchi contrassegnati con la marcatura CE

PCE- MB 50, 100 and 200

marked with CE mark comply with the following:

1. EN 61010-1 standard *Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements* harmonized with the directive 73/23/EEC (Low Voltage Directive).
2. EN 55022:2000 standard *Limits and methods of measurement of radio disturbance characteristics of information technology equipment* and IEC 61000-4-3 Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test, harmonised with the Council Directive 89/336/EEC.

Additional information
- Conformity evaluation for the Council Directives 73/23/EEC and 89/336/EEC were carried out by ……

Date: 12.11.2005

Signature: _____
PCE-GROUP Europe OHG

Management

Appendix – Drying parameters for different substances (examples) [1]

No	Substance	Initial weight (g)	Temperature (°C)	Preparation	Analysing time (min)
1.	Cotton seeds	3-4	110	grind a sample for 1 min.	6.3
2.	Bean	4.5	150	grind a sample	9.7
3.	Butter	1.7	140	tear up a foil	4.3
4.	Photo paper	2	150	tear up in 1 cm^2 pieces	6.4
5.	Dialyse membrane	0.5	80	cut into thin slices	2.2
6.	Dialyse membrane	0.5-0.7	80	cut into thin slices	2
7.	Pea	3.5	135	grind for 30 sec.	7.9
8.	Peanuts	2.8	100	grind into thick powder	4
9.	Peanuts	3	100	grind into thick powder	6
10.	Mint pastilles	3-3.4	90	grind into thick powder	2.9
11.	Ceramics clay	2.5	160	cut into thin slices	9
12.	River water	4	160	mix a sample	20
13.	Dissolvent	2	155	mix a sample	7.6
14.	Cottage cheese	6	140	mix a sample	
15.	Dry beans	3-4	105	grind a sample	5
16.	Dry peas	5-7	110	grind a sample for 10 sec.	9.6
17.	Dry carrot	5.5-6	120	grind a sample	3
18.	Dry corn	5-7	110	grind a sample	10
19.	Nuts	2.2	100	grind into thick powder	3.8
20.	Nuts in shells	2.6	100	grind into thick powder	4.5
21.	Coffee seeds	3.5-4	120	grind a sample for 1 min.	8
22.	Dry potato pieces	2.5-3.0	130	divide a mass	5.8
23.	Resin dissolvent	2	160	mix a sample	5.9
24.	Lentil	4	135	grind a sample for 30 sec.	5.4
25.	Loess soil	2.5	160	cut into small pieces	14.5
26.	Skimmed milk	5	110	mix a sample	
27.	Cottage cheese	1.2	130	mix a sample	8
28.	Almonds with caramel	3.5	80	grind into thick powder	4.8
29.	Normal almonds	2.5	100	grind into thick powder	5.3
30.	Almonds	3	100	grind into thick powder	5.3
31.	Materials for bricks	7	160	distribute a sample	20
32.	Whey	5	110	mix a sample	
33.	Multivitamin bars	3-3.4	115	grind into thick powder	3.3
34.	Natural latex	1.4	160	mix a sample	5.3